Title: Should I Watch Television, Go to Work, or Study?

Brief Overview:

> Students will collect data over a five week period for number of hours spent daily on studying (includes time spent doing homework), on watching television, and on working at their part-time job. Each week the student will use the graphing calculator to analyze their data. At the end of the five weeks, each student will compile their data and find the average amount of time spent per week on each activity. The teacher will then put those average times and student's grade for that five-week period on a summary sheet. Each student will then enter that information for the class into the lists of their calculators for analysis.

Links to NCTM Standards:

- **Mathematics as Problem Solving**
  Students will demonstrate their ability to solve mathematical problems through the collection of data and using statistics to analyze data.

- **Mathematics as Communication**
  Students will summarize the results of our study investigating the relationship between number of hours spent studying, working, or watching television with the grade received in their mathematics class.

- **Mathematics as Reasoning**
  Students will construct an argument based on mathematics to support the conclusion(s) reached in their analysis.

- **Statistics**
  Students will learn the meaning of histogram, box and whiskers plot, scatter plot, and line of best fit while drawing inferences from charts, tables, and graphs that summarize the data collected.

Grade/Level:

> Grades 8-12

Duration/Length:

> This activity will take 2 or 3 days. The activities may take longer than anticipated depending on class duration and student's prior knowledge, but the time will be spread over the five-week period.

Prerequisite Knowledge:

> Students should have working knowledge of the following skills:

- Familiarity with the TI-83 graphing calculator
- Meaning of measures of central tendency

Objectives:

Students will:

- collect data.
- use a graphing calculator to organize and graph the data.
- interpret a set of data.
- communicate findings by answering questions.

Materials/Resources/Printed Materials:

- TI-83 calculators/overhead projector
- Student data collection sheets
- Student activity worksheets
- Class data summary sheet overhead transparency

Development/Procedures:

- Students will receive weekly data collection sheets for five weeks.
- Students will analyze data collected for week one (and each week thereafter, if teacher desires) using various types of graphs.
- Students will find the average amount of time spent per week for each activity at the end of five weeks.
- The summary sheet will include that data with the student's grade.
- Students will enter that information for the class into their calculator.
- The teacher should lead the class through the activity sheet. It is suggested that students work in pairs for this activity.

Evaluation:

The students will submit the activity sheets for a grade.

Extension/Follow Up:

- Students could collect and analyze other sets of data, using the processes practiced during this unit.
- Students could create posters or bulletin boards to display their work.

Authors:

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Name _____   Week # 1 Log Sheet

DAY OF WEEK	HOURS SPENT WATCHING TELEVISON	HOURS SPENT AT JOB	HOURS SPENT DOING MATHEMATICS HOMEWORK
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			
TOTAL HOURS			

Input your data that you collected in the following manner.
Let L_1 represent the hours of TV that you watched for the week.
Let L_2 represent the hours that you work on your job per week.
Let L_3 represent the hours that you spent working on your homework for the week.

1. Graph the number of hours that you spent watching TV, using a histogram.
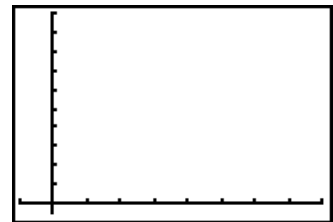   State the window: Sketch the graph.
       Xmin =____
       Xmax =____
       Xscl =____
       Ymin =____
       Ymax =____
       Yscl =____

   Does your amount of TV increase or decrease on the weekend? _____
   Explain. _____

   Find the mean. _____ Find the median. _____

2. Graph the number of hours that you spent working, using a histogram.
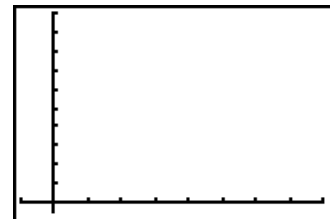   State the window: Sketch the graph.
       Xmin =____
       Xmax =____
       Xscl =____
       Ymin =____
       Ymax =____
       Yscl =____

Does the number of hours working increase or decrease on certain days? _____
Explain _____

Find the mean. _____   Find the median. _____

3. Graph the number of hours that you spent doing your math homework, using a
   histogram.
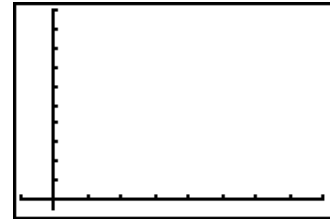   State the window: Sketch the graph.
       Xmin =____
       Xmax =____
       Xscl =____
       Ymin =____
       Ymax =____
       Yscl =____

   Does the amount of time spent on your math homework increase or decrease on
   certain days? _____
   Explain._____

   Find the mean. _____   Find the median. _____

DAY OF WEEK	HOURS SPENT WATCHING TELEVISON	HOURS SPENT AT JOB	HOURS SPENT DOING MATHEMATICS HOMEWORK
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			
TOTAL HOURS			

Input your data that you collected in the following manner.
Let L_1 represent the hours of TV that you watched for the week.
Let L_2 represent the hours that you work on your job per week.
Let L_3 represent the hours that you spent working on your homework for the week.

1. Graph the number of hours that you spent watching TV, using a histogram.
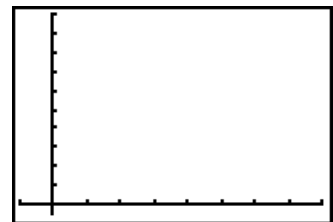   State the window: Sketch the graph.
       Xmin =____
       Xmax =____
       Xscl =____
       Ymin =____
       Ymax =____
       Yscl =____

Does your amount of TV increase or decrease on the weekend? _____
Explain. _____

Find the mean. _____   Find the median. _____

2. Graph the number of hours that you spent working, using a histogram.
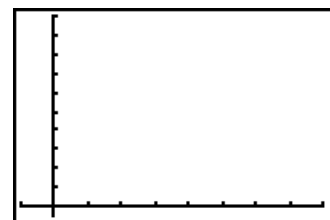   State the window: Sketch the graph.
       Xmin =____
       Xmax =____
       Xscl =____
       Ymin =____
       Ymax =____
       Yscl =____

Does the number of hours working increase or decrease on certain days? _____ Explain

_____

Find the mean. _____ Find the median. _____

3. Graph the number of hours that you spent doing your math homework, using a histogram.
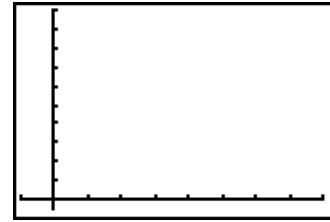
State the window: Sketch the graph.

Xmin =____

Xmax =____

Xscl =____

Ymin =____

Ymax =____

Yscl =____

Does the amount of time spent on your math homework increase or decrease on certain days? _____ Explain._____

Find the mean. _____ Find the median. _____

Name _____   Week # 3 Log Sheet

DAY OF WEEK	HOURS SPENT WATCHING TELEVISON	HOURS SPENT AT JOB	HOURS SPENT DOING MATHEMATICS HOMEWORK
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			
TOTAL HOURS			

Input your data that you collected in the following manner.
Let L_1 represent the hours of TV that you watched for the week.
Let L_2 represent the hours that you work on your job per week.
Let L_3 represent the hours that you spent working on your homework for the week.

1. Graph the number of hours that you spent watching TV, using a histogram.
    State the window: Sketch the graph.
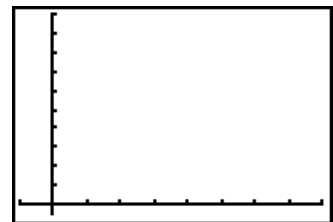   Xmin =____
        Xmax =____
        Xscl =____
        Ymin =____
        Ymax =____
        Yscl =____

    Does your amount of TV increase or decrease on the weekend? _____
    Explain. _____

    Find the mean. _____   Find the median. _____

2. Graph the number of hours that you spent working, using a histogram.
    State the window: Sketch the graph.
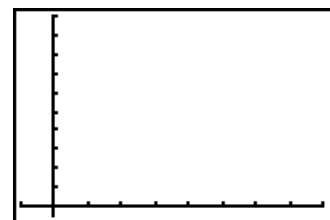   Xmin =____
        Xmax =____
        Xscl =____
        Ymin =____
        Ymax =____
        Yscl =____

Does the number of hours working increase or decrease on certain days? _____
Explain _____

Find the mean. _____   Find the median. _____

3. Graph the number of hours that you spent doing your math homework, using a
    histogram.

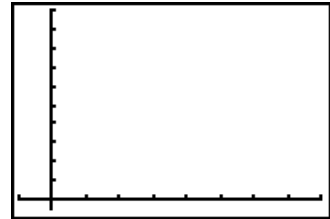   State the window: Sketch the graph.
        Xmin =____
        Xmax =____
        Xscl =____
        Ymin =____
        Ymax =____
        Yscl =____

     Does the amount of time spent on your math homework increase or decrease on
    certain days? _____
    Explain._____

    Find the mean. _____   Find the median. _____

DAY OF WEEK	HOURS SPENT WATCHING TELEVISON	HOURS SPENT AT JOB	HOURS SPENT DOING MATHEMATICS HOMEWORK
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			
TOTAL HOURS			

Input your data that you collected in the following manner.

Let L_1 represent the hours of TV that you watched for the week.

Let L_2 represent the hours that you work on your job per week.

Let L_3 represent the hours that you spent working on your homework for the week.

1. Graph the number of hours that you spent watching TV, using a histogram.
    State the window: Sketch the graph.
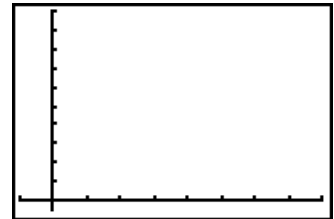
    Xmin =____
    Xmax =____
    Xscl =____
    Ymin =____
    Ymax =____
    Yscl =____

    Does your amount of TV increase or decrease on the weekend? _____
    Explain. _____

    Find the mean. _____   Find the median. _____

2. Graph the number of hours that you spent working, using a histogram.
    State the window: Sketch the graph.
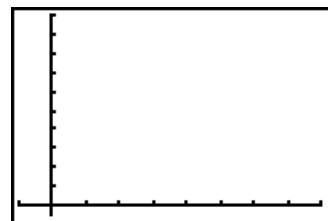
    Xmin =____
    Xmax =____
    Xscl =____
    Ymin =____
    Ymax =____
    Yscl =____

Does the number of hours working increase or decrease on certain days? _____
Explain _____

Find the mean. _____ Find the median. _____

3. Graph the number of hours that you spent doing your math homework, using a histogram.

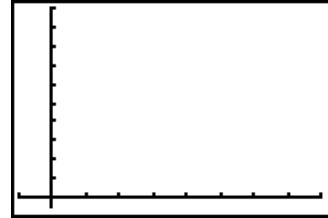State the window: Sketch the graph.

    Xmin =____
    Xmax =____
    Xscl =____
    Ymin =____
    Ymax =____
    Yscl =____

Does the amount of time spent on your math homework increase or decrease on certain days? _____
Explain._____

Find the mean. _____ Find the median. _____

DAY OF WEEK	HOURS SPENT WATCHING TELEVISON	HOURS SPENT AT JOB	HOURS SPENT DOING MATHEMATICS HOMEWORK
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			
TOTAL HOURS			

Input your data that you collected in the following manner.
Let L_1 represent the hours of TV that you watched for the week.
Let L_2 represent the hours that you work on your job per week.
Let L_3 represent the hours that you spent working on your homework for the week.

1. Graph the number of hours that you spent watching TV, using a histogram.
   State the window: Sketch the graph.
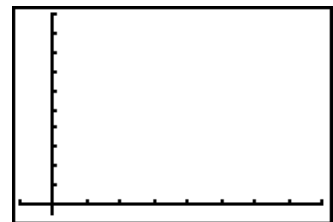   Xmin =____
      Xmax =____
      Xscl =____
      Ymin =____
      Ymax =____
      Yscl =____

   Does your amount of TV increase or decrease on the weekend? _____
   Explain. _____

   Find the mean. _____   Find the median. _____

2. Graph the number of hours that you spent working, using a histogram.
   State the window: Sketch the graph.
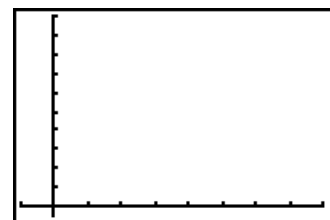   Xmin =____
      Xmax =____
      Xscl =____
      Ymin =____
      Ymax =____
      Yscl =____

Does the number of hours working increase or decrease on certain days? _____
Explain _____

Find the mean. _____   Find the median. _____

3. Graph the number of hours that you spent doing your math homework, using a histogram.
   State the window: Sketch the graph.
       Xmin =____
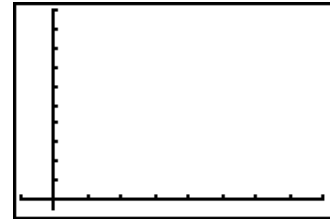   Xmax =____
       Xscl =____
       Ymin =____
       Ymax =____
       Yscl =____

   Does the amount of time spent on your math homework increase or decrease on certain days? _____
   Explain._____

   Find the mean. _____   Find the median. _____

Name _____

Summary of 5 weeks

Week	Hours Spent Watching Television	Hours Spent at Job	Hours Spent Doing Mathematics Homework
#1			
#2			
#3			
#4			
#5			
Total Hours			
Average Hours Per Week			

1. Using the above information and the following key, graph the three sets of data for each of the five weeks. Make 3 box plots, one for each list.

   L_1 = the number of hours that you watched TV for the week
   L_2 = the number of hours that you worked for the week
   L_3 = the number of hours that you spent doing your math homework for the week

   State the window: Sketch the graph.
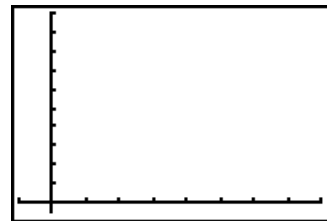   Xmin =____
       Xmax =____
       Xscl =____
       Ymin =____
       Ymax =____
       Yscl =____

   Find the median for TV. _____

   Find the median for work. _____

   Find the median for studying. _____

Summary Sheet for Class

Student	Hours per Week Watching TV	Hours per Week at Job	Hours per Week Doing Mathematics Homework	Grade F = 0 D = 1 C = 2 B = 3 A = 4
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				

Name _____   Worksheet #7

1. Input class data into your calculator.

   L_1 = the number of hours that the class averaged watching TV for the week
   L_2 = the number of hours that the class averaged working for the week
   L_3 = the number of hours that the class averaged doing their math homework for the
         week
   L_4 = the number representing the grade

2. Graph the number of hours that the class spent watching TV and the grade using a
   scatter plot.
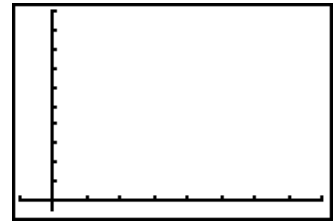
   State the window: Sketch the graph.
        Xmin =____
        Xmax =____
        Xscl =____
        Ymin =____
        Ymax =____
        Yscl =____

   When you look at the graph, does there appear to be a relationship between the two
   variables? _____

   Explain. _____

   Find the mean. _____   Find the median. _____

   Use your calculator to find the line of best fit.

   Write the equation of that line: _____

   What is the correlation coefficient? _____

   What does this mean? _____

3. Graph the number of hours that the class spent working and the grade using a
   scatter plot.

   State the window: Sketch the graph.
        Xmin =____
        Xmax =____
        Xscl =____
        Ymin =____
        Ymax =____
        Yscl =___

When you look at the graph, does there appear to be a relationship between the two variables? _____

Explain. _____

Find the mean. _____   Find the median. _____

Use your calculator to find the line of best fit.

Write the equation of that line: _____

What is the correlation coefficient? _____

What does this mean? _____

4. Graph the number of hours that the class spent studying and the grade using a scatter plot.

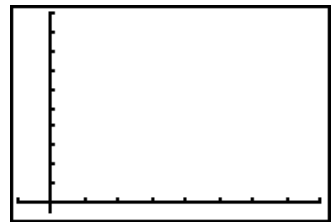State the window: Sketch the graph.
   Xmin =____
   Xmax =____
   Xscl =____
   Ymin =____
   Ymax =____
   Yscl =____

When you look at the graph, does there appear to be a relationship between the two variables? _____

Explain. _____

Find the mean. _____   Find the median. _____

Use your calculator to find the line of best fit.

Write the equation of that line: _____

What is the correlation coefficient? _____

What does this mean? _____

5. Go back to problems 2, 3, and 4. Look at the different correlation coefficients. What conclusions can you make?

Performance Assessment: Writing Across the Curriculum

Background:

You have just finished collecting data on your work/study habits and those of your classmates. We have compiled the data of the entire class and analyzed that. What does it all mean?

Audience:

Write an essay as an entry in your journal summarizing the results of the study of our class. Include how your averages compare to the mean and median of the class.

Length:

It should be two or more paragraphs.

Focus Correction Areas (FCA):

1) You will correctly use the terms mean, median, line of best fit, correlation coefficient, box plot, scatter plot, histogram in your discussion. (20 points)
2) Compare the mean and median of the class with your averages in each category, and summarize what that might mean in relationship to your interim grade. (20 points)
3) Complete sentences and correct spelling must be used. (10 points)

Due Date:

It will be due at the beginning of class on _____. Don't forget to read it aloud and make your final corrections before you come to class. Also remember that your essay needs to be double-spaced, and your FCA's are to be written at the top of the page.